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A quantitative analysis of alteration in the Carbon Leader Reef in the West Wits Line Goldfield: an application of Shortwave Infrared Reflectance Spectroscopy

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Legend for Spectral Facies Images

Flat spectra (+pyrophyllite/chloritoid/silica/chlorite/white mica)
Silica

Pyrophyllite dominant
Pyrophyllite (prl)
Pyrophyllite + chloritoid (prl + ctd)
Pyrophyllite + chlorite (prl + chl)
Pyrophyllite + sericite (prl + ser)

Chloritoid dominant
Chloritoid (ctd)
Chloritoid + pyrophyllite (ctd + prl)
Chloritoid + sericite (ctd + ser)

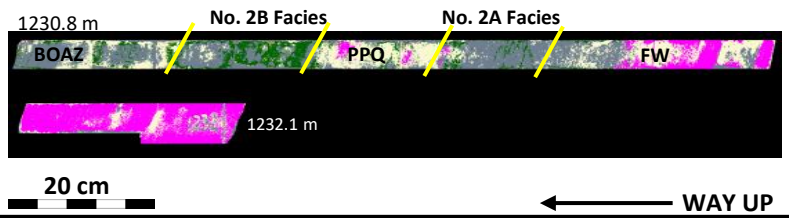
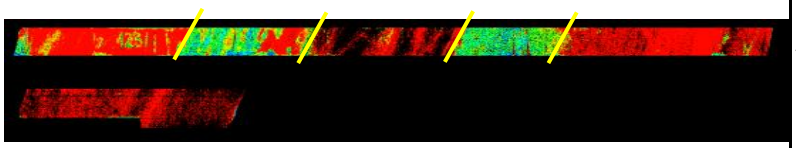
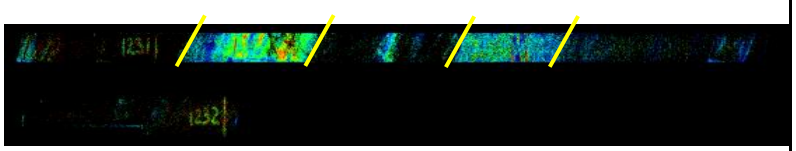
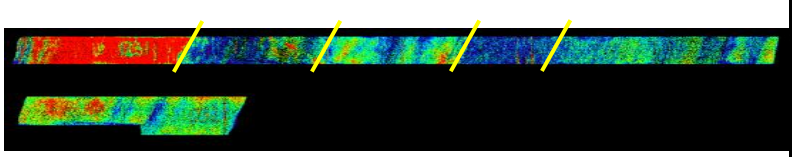
Sericite dominant
Sericite (ser)
Sericite + chloritoid (ser + ctd)
Sericite + chlorite (ser + chl)

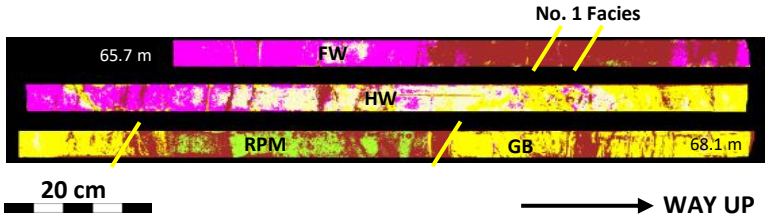
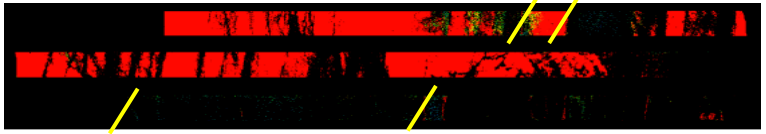
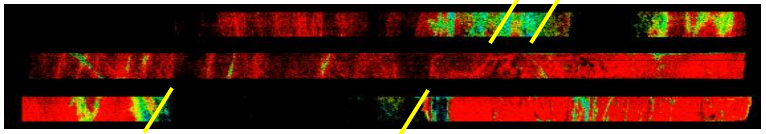
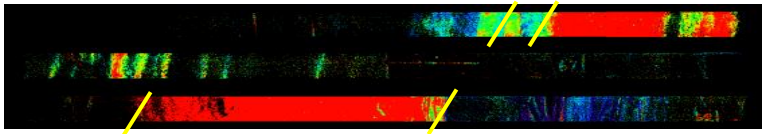
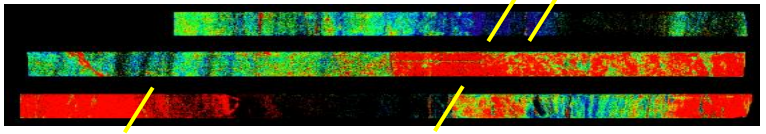
Chlorite dominant
Chlorite (chl)
Chlorite + sericite (chl + ser)

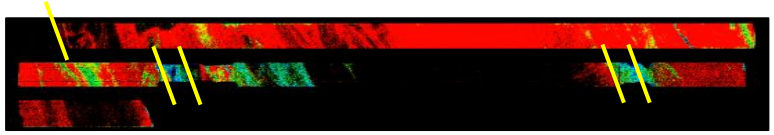
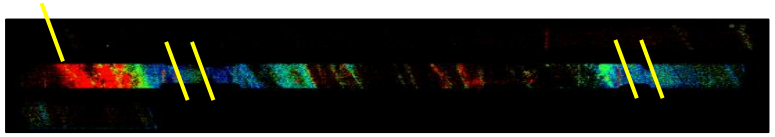
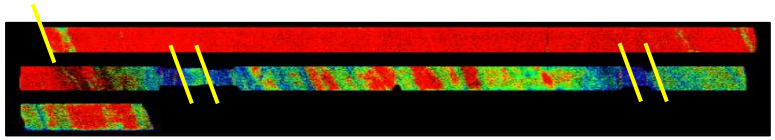
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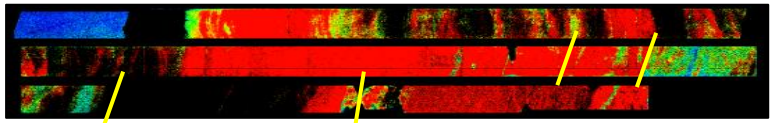
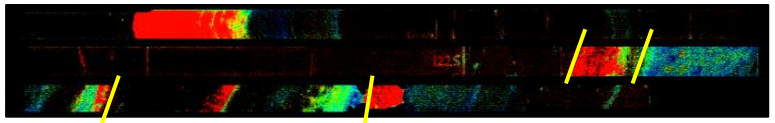
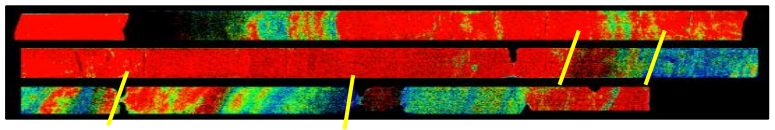
HW	Hangingwall
FW	Footwall
FWPB	Footwall Pebble Band
PPQ	Pale Pebbly Quartzite
BOAZ	Brown-Orange Argillaceous Zone
IQ	Internal Quartzite
RPM	Rice Pebble Marker
GB	Green Bar

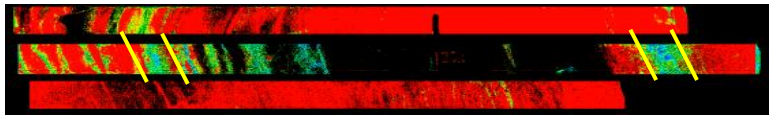
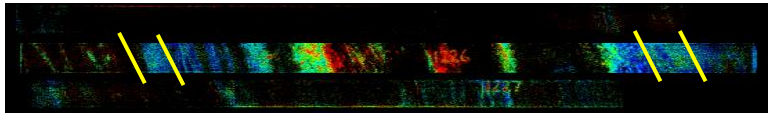
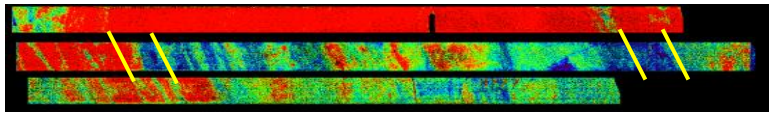
*For the feature extraction images: cooler colours (shades of dark purple and blue) indicate a low response to the feature extraction, and warmer colours (shades of green, orange and red) indicate a moderate to high response to the feature extraction.

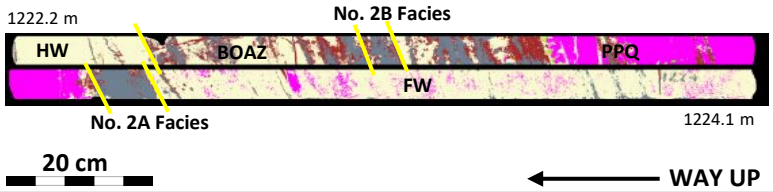
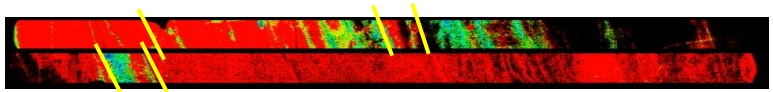
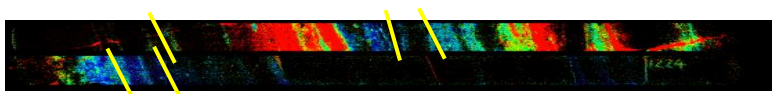
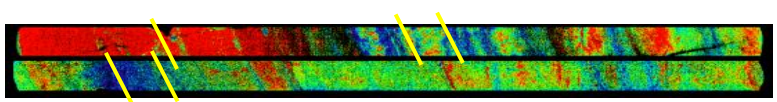
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	Image Type	**Scanned Image**	**Reef Description**
Sample 22 GBH 1000 D6	Spectral Facies		Both the upper (No. 2B Facies) and lower (No. 2A Facies) reef bands are ser-dominant with lesser amounts of chl + ser combinations.
	Pyrophyllite (λ = 2165 nm)		Prl is highly responsive at the bottom contacts for both the upper and lower reef bands, suggesting a concentration of prl nearer to the bottom contacts.
	Sericite (λ = 2200 nm)		The sericite feature extraction shows ser is highly responsive in the upper reef band and moderately responsive in the lower reef band, suggesting higher concentrations of ser in the upper reef band.
	Chlorite (λ = 2250 nm)		The upper reef band is moderately responsive in comparison to the lower reef band, indicating higher amounts of chl is present in the upper reef band.
	Chloritoid (λ = 2390 nm)		Ctd is moderately responsive, with the highest response at the base of the upper reef band.

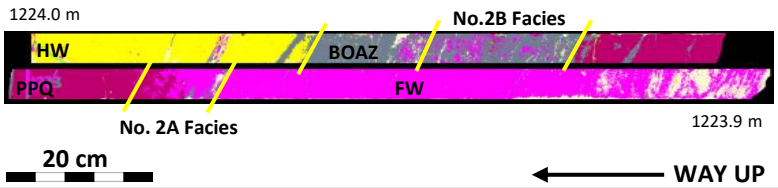
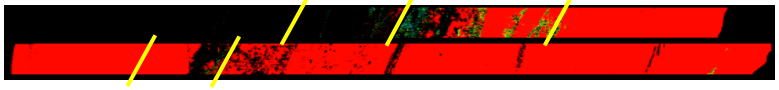
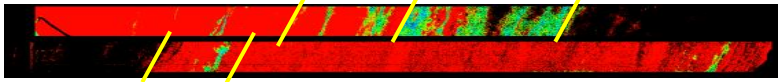
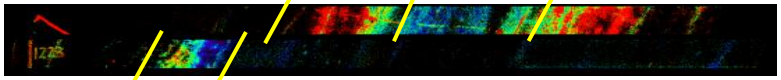
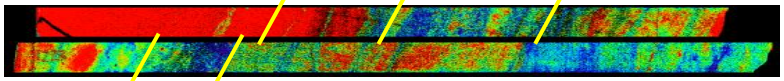
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	Image Type	**Scanned Image**	**Reef Description**
Sample 30 GBH 6003	Spectral Facies		The reef band has both prl + chl and prl + ser combinations.
	Pyrophyllite (λ = 2165 nm)		The pyrophyllite feature extraction shows prl is highly responsive, indicating that there is a large amount of prl present.
	Sericite (λ = 2200 nm)		Ser is moderately responsive in the reef, with more response to the sericite feature extraction nearer to the bottom contact with the footwall.
	Chlorite (λ = 2250 nm)		Chl is moderately responsive in the reef. A higher response can be seen nearer to the bottom contact with the footwall suggesting a greater concentration of chl.
	Chloritoid (λ = 2390 nm)		The chloritoid feature extraction shows ctd is not responsive, suggesting very little to no ctd is present within the reef band.

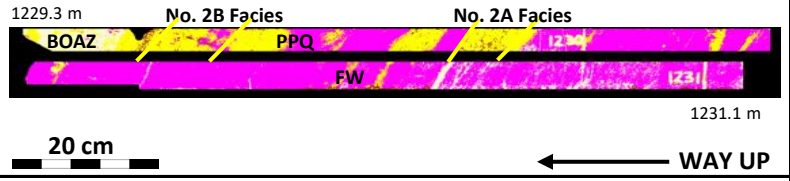
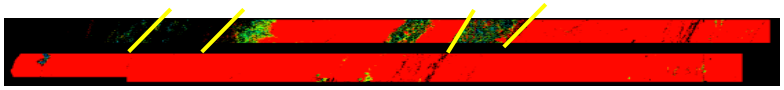
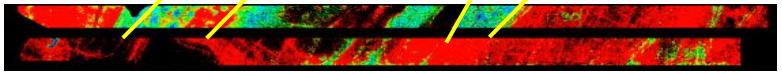
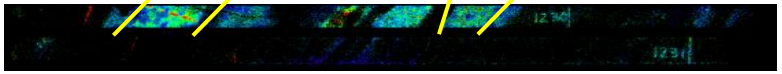
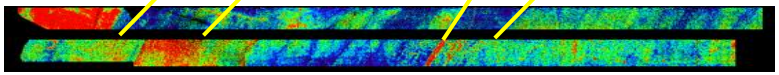
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	Image Type	**Scanned Image**	**Reef Description**
Sample 35 GBH 1000 D0	Spectral Facies		Chl, chl + ser and ctd + prl combinations present within the upper reef band (No. 2B Facies). The lower reef band (No. 2A Facies) is dominated by a chl + ser combination.
	Pyrophyllite (λ = 2165 nm)		Small amounts of prl present within both reef bands however not in large amounts such as those seen in the internal quartzite and footwall units.
	Sericite (λ = 2200 nm)		The ser feature extraction indicates a small amont of ser is present within both reef bands.
	Chlorite (λ = 2250 nm)		Chl is present in both reef bands, however in minimal concentrations. The BOAZ has the highest response to the chlorite feature extraction.
	Chloritoid (λ = 2390 nm)		Ctd is not extremely responsive in the reef bands, indicating that there is a low amount of ctd present.

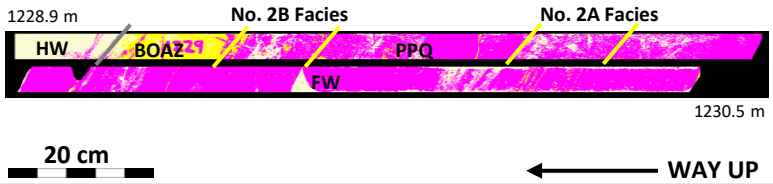
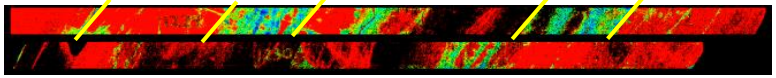
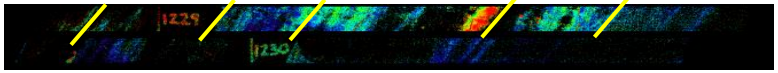
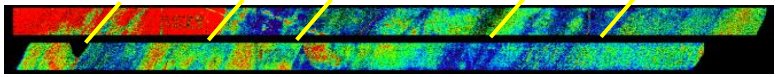
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	Image Type	**Scanned Image**	**Reef Description**
Sample 36 GBH 1000 D1	Spectral Facies		The No. 2B Facies is mostly silica-dominated with a minor ctd + prl combination. The lower reef band (No. 2A Facies) is absent (missing core).
	Pyrophyllite (λ = 2165 nm)		Prl is present within the No. 2B Facies.
	Sericite (λ = 2200 nm)		Ser is somewhat responsive in the reef band indicating a presence of ser. There is a high response to the ser feature extraction from the top contact of the No. 2B Facies, and throughout the BOAZ. This suggests higher concentrations of ser are present.
	Chlorite (λ = 2250 nm)		The chl feature extraction indicates a small amount of chl is present within the No. 2B Facies.
	Chloritoid (λ = 2390 nm)		Ctd is somewhat responsive in the No. 2B Facies indicating a low amount of ctd is present. From the upper contact of the BOAZ above the No. 2B Facies band there is a high response to the ctd feature extraction, suggesting a higher concentration of chl.

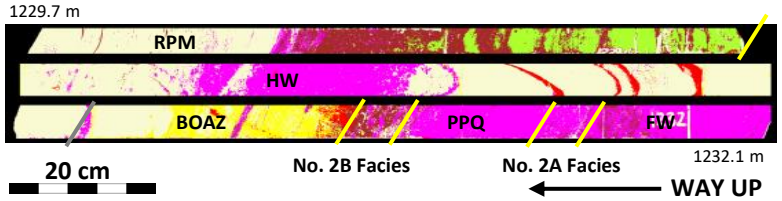
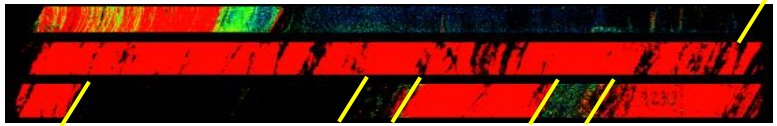
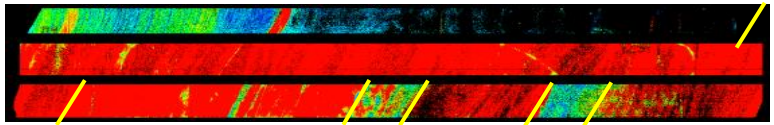
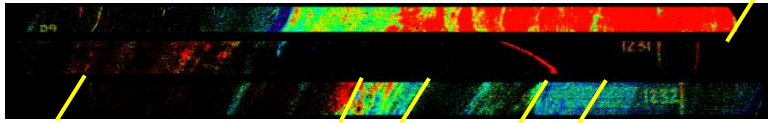
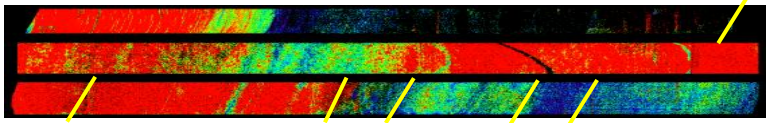
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 37 GBH 1000 D2	Spectral Facies		The upper reef band (No. 2B Facies) is dominantly silica-rich with a very low concentration of prl. The lower reef band (No. 2A Facies) has a moderate combination of ctd + prl.
	Pyrophyllite (λ = 2165 nm)		Prl has a low response to the feature extraction within both reef bands. The upper reef band has a small area where there is a high response, indicating a larger concentration of prl. The lower reef band has a concentration of prl at its base.
	Sericite (λ = 2200 nm)		Ser is moderately to highly responsive in both reef bands. The upper reef band shows a concentration of ser at both the top and bottom contacts. The lower reef band has a concentration of ser at its base.
	Chlorite (λ = 2250 nm)		There is very little response in the upper reef band to the chlorite feature extraction. The lower reef band is somewhat responsive indicating minimal chl is present.
	Chloritoid (λ = 2390 nm)		The No. 2B Facies is highly responsive in comparison to the No. 2A Facies, indicating there is more ctd present within the upper reef band.

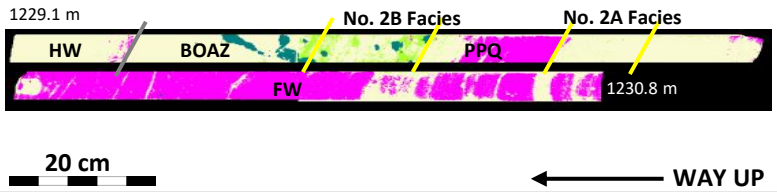
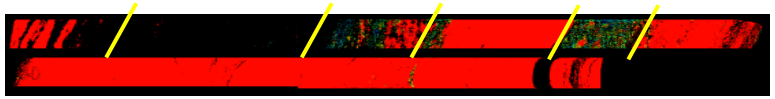
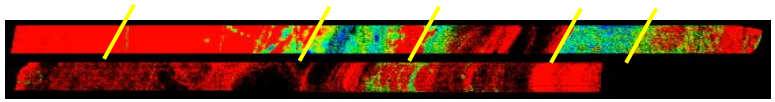
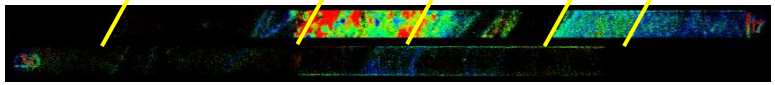
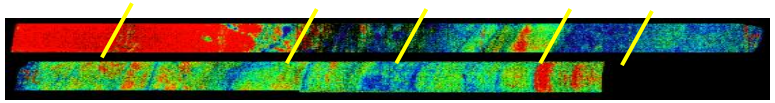
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	Image Type	**Scanned Image**	**Reef Description**
Sample 38 GBH 1000 D4	Spectral Facies		The upper (No. 2B Facies) and lower reef (No. 2A Facies) bands are ser-rich with a small concentration of prl.
	Pyrophyllite (λ = 2165 nm)		The upper reef band has a concentration of prl at the top contact with the BOAZ. The lower reef band has a very small concentration of prl at the bottom contact with the footwall.
	Sericite (λ = 2200 nm)		Ser is moderately to highly responsive to the ser feature extraction. In the upper reef band ser is concentrated at its top contact with the BOAZ. In the lower reef band there is a concentration of ser at the base.
	Chlorite (λ = 2250 nm)		Chl is poorly responsive throughout both reef bands, indicating a low concentration of chl.
	Chloritoid (λ = 2390 nm)		Ctd is moderately to highly responsive in the upper reef band, suggesting there is a fair amount of ctd present. There is a lower response in the bottom reef band, indicating less ctd is present.

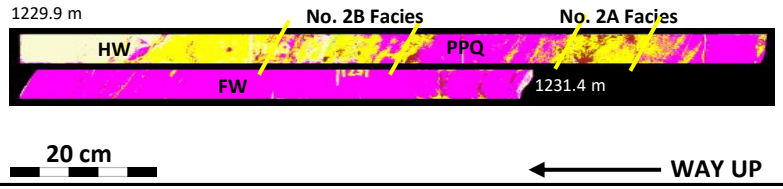
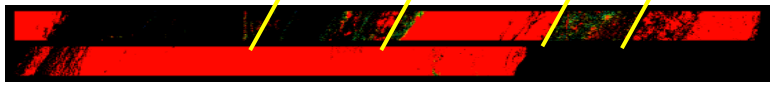
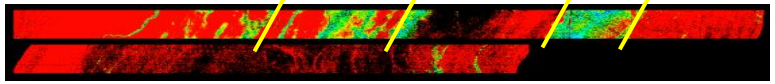
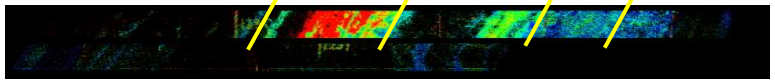
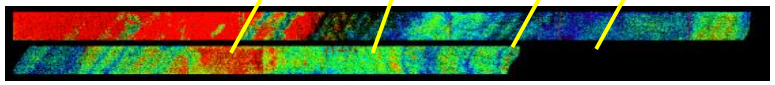
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 39 GBH 1000 D5	Spectral Facies		The upper reef band (No. 2B Facies) is dominated by a ser and ctd + prl combination. The lower reef band (No. 2A Facies) is dominated by ctd + prl, as well as prl on its own.
	Pyrophyllite (λ = 2165 nm)		Prl is highly responsive in both the upper and lower reef bands. The upper reef band has a concentration of prl nearer to the base whereas the lower reef band has a concentration of prl at the top of the reef band.
	Sericite (λ = 2200 nm)		Ser is highly responsive in the lower reef band and moderately responsive in the upper reef band. The lower reef band has a greater concentration of ser.
	Chlorite (λ = 2250 nm)		The chl feature extraction shows the chl is somewhat responsive, indicating a small amount of chl within both reef bands.
	Chloritoid (λ = 2390 nm)		The ctd feature extraction shows ctd is moderately responsive, particularly in the upper reef band. This suggests that there is a higher concentration of ctd in the upper reef band than in the lower reef band.

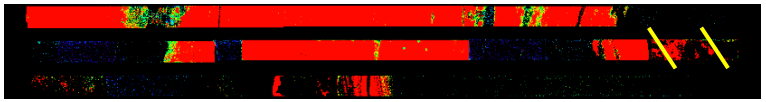
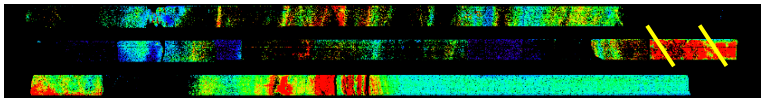
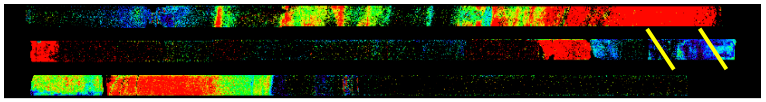
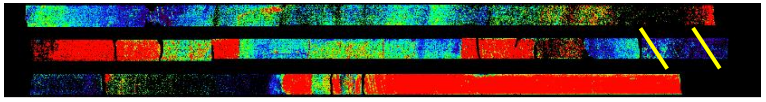
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 40 GBH 1000 D7	Spectral Facies		Both reef bands are silica-rich with small amounts of prl and ctd + prl in the upper reef band (No. 2B Facies), and silica-rich with very little ctd + prl concentrations in the lower reef band (No. 2A Facies).
	Pyrophyllite (λ = 2165 nm)		The upper reef band is non-responsive to the prl feature extraction, and the lower reef band is almost unresponsive. There is a higher response seen closer to the reef-footwall contact.
	Sericite (λ = 2200 nm)		Ser is highly responsive in the top reef band, with a concentration nearer to its base. Within the lower reef band there is a moderate response.
	Chlorite (λ = 2250 nm)		The chl feature extraction shows chl is somewhat responsive, suggesting a presence of chl in both reef bands. The upper reef band is slightly more responsive than the lower reef bands.
	Chloritoid (λ = 2390 nm)		The ctd feature extraction shows a small amount of responsiveness, indicative of a small amount of ctd present within both reef bands.

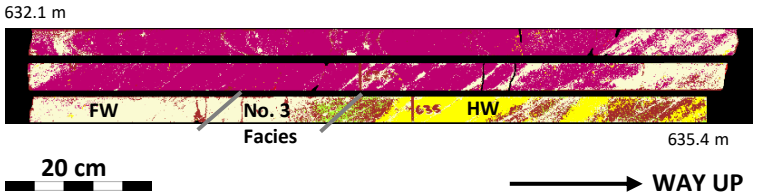
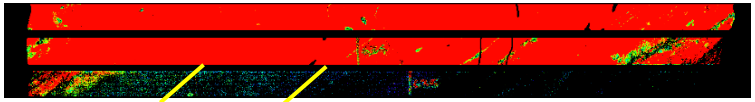
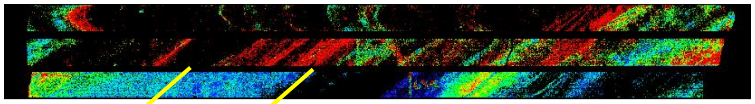
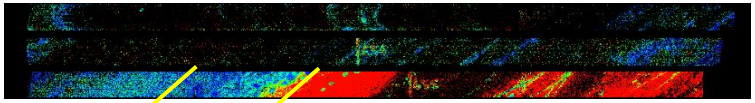
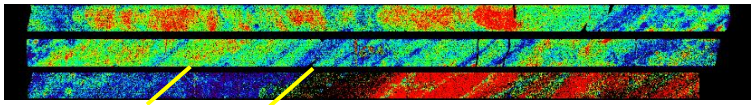
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 41 GBH 1000 D8	Spectral Facies		Both the upper (No. 2B Facies) and lower (No. 2A Facies) reef bands are ctd + prl dominant with smaller amounts of silica.
	Pyrophyllite (λ = 2165 nm)		The upper reef band is non-responsive whereas the bottom reef band is highly responsive, indicating a higher concentration of prl within the lower reef band.
	Sericite (λ = 2200 nm)		The ser feature extraction indicates a moderate amount of ser is present within both reef bands, with higher concentrations nearer to the base.
	Chlorite (λ = 2250 nm)		Chl is not that responsive in both reef bands, suggesting that there are low amounts of chl within the reef packages.
	Chloritoid (λ = 2390 nm)		Moderately responsive ctd is seen within both reef bands, indicating a fair amount of ctd is present within the reef packages.

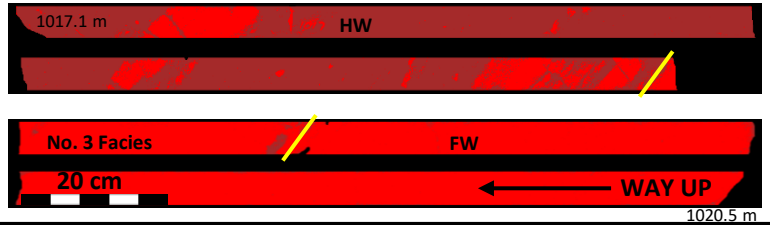
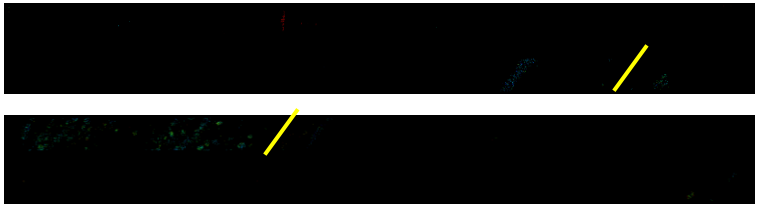
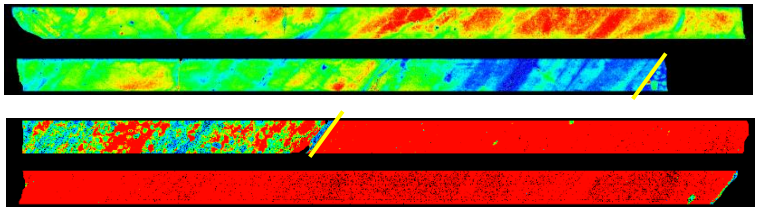
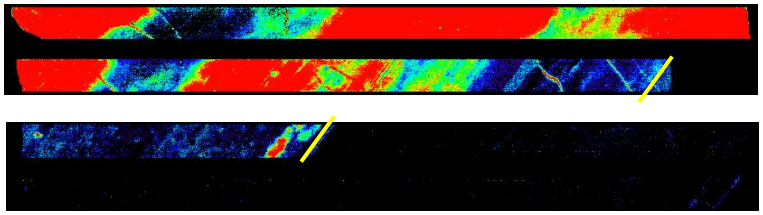
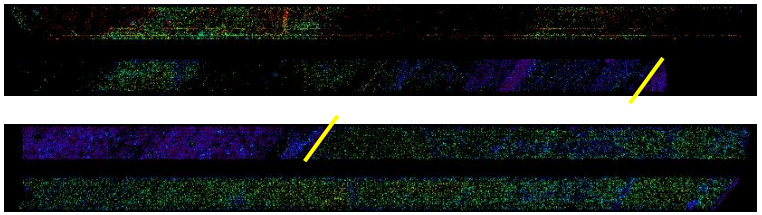
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 42 GBH 1000 D9	Spectral Facies		Ctd + prl and prl combinations present within both the upper (No. 2B Facies) and lower (No. 2A Facies) reef bands.
	Pyrophyllite (λ = 2165 nm)		Prl is non-responsive in the upper reef band and moderately responsive at the base of the lower reef band, suggesting a concentration of prl within the lower reef band nearer to the footwall contact.
	Sericite (λ = 2200 nm)		The upper reef band is highly responsive with a larger concentration of ser at the top of the reef band. The lower reef band is moderately responsive indicating ser is present.
	Chlorite (λ = 2250 nm)		The upper reef band is more responsive than the lower reef band, suggesting a larger concentration of chl in the upper reef band compared to the lower reef band.
	Chloritoid (λ = 2390 nm)		Ctd is somewhat responsive in both reef bands suggesting a small amount of ctd is present.

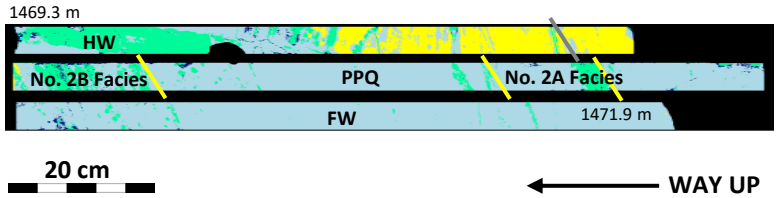
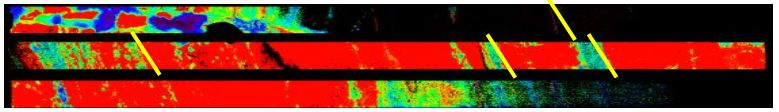
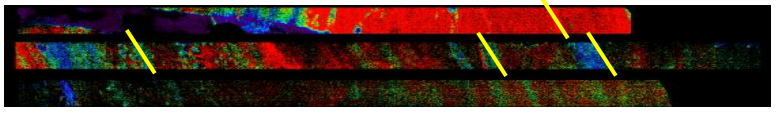
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 43 GBH 1000 D10	Spectral Facies		The upper reef band (No. 2B Facies) is silica-dominated with chl, ctd + prl and ser + ctd combinations. The lower reef band (No. 2A Facies) displays mostly silica.
	Pyrophyllite (λ = 2165 nm)		Prl is more responsive in the upper reef band compared to the lower reef band. Prl is mostly concentrated at the bottom contacts for the upper reef band.
	Sericite (λ = 2200 nm)		Moderately responsive ser can be seen in both reef bands. There is a high response to the sericite feature extraction nearer to the borrom contact of the upper reef band, indicating a higher presence of ser.
	Chlorite (λ = 2250 nm)		Highly responsive chl can be seen within the top reef band, indicating a larger concentration of chl than within the lower reef band, which has a weaker response to chl extraction feature.
	Chloritoid (λ = 2390 nm)		The upper reef band is less responsive to the ctd feature extraction than the lower reef band. This indicates that there is less ctd in the upper reef band.

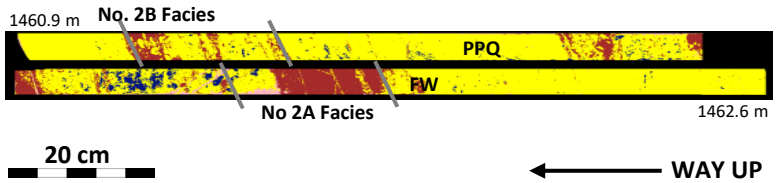
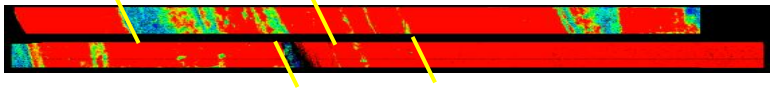
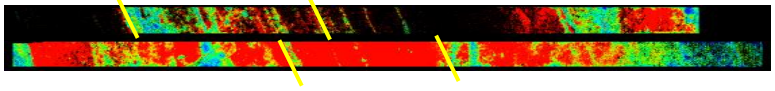
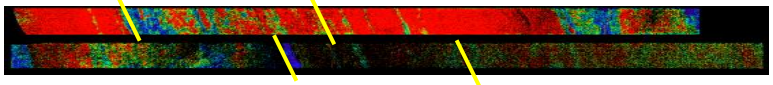
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 44 GBH 1000 D11	Spectral Facies		Flat spectra are dominant within both reef bands. The upper reef band has ctd + prl and the lower reef band has prl, prl + ctd and prl + chl combinations.
	Pyrophyllite (λ = 2165 nm)		There is a low response to the prl feature extraction in both reef bands, with the exception of the base of the upper reef band, indicating a higher concentration of prl.
	Sericite (λ = 2200 nm)		Ser is highly responsive in the upper reef band and moderately responsive in the lower reef band. A concentration of ser can be seen at the base of the lower reef band, and the upper and lower contacts of the No. 2B Facies reef band.
	Chlorite (λ = 2250 nm)		The chl feature extraction shows the chl is highly responsive in the upper reef band in comparison to the lower reef band, suggesting greater amounts of chl is present within the upper reef band.
	Chloritoid (λ = 2390 nm)		The upper reef band is more responsive to the ctd feature extraction than the lower reef band, indicating larger concentrations of ctd in the top reef band.

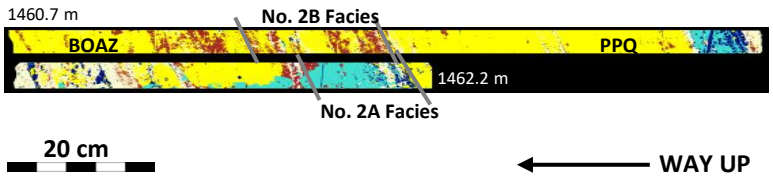
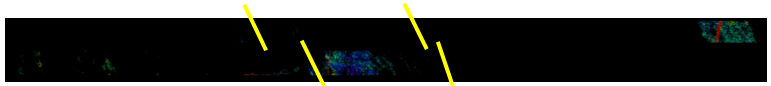
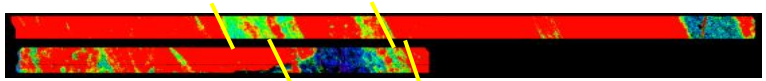
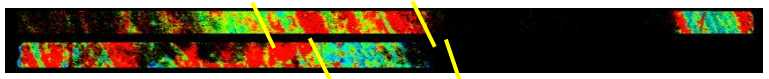
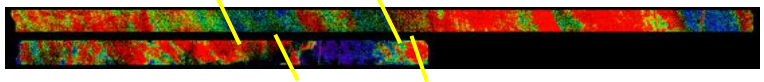
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 45 GBH 6008	Spectral Facies		The reef has ctd, ctd + prl as well as ctd + ser combinations, with the dominant combination of ctd + prl.
	Pyrophyllite (λ = 2165 nm)		Overall there is a low response for prl, with the exception of the contacts with the hangingwall and footwall where it tends to be highly responsive. This suggests there is a larger concentration of prl at the top and bottom contacts of the reef.
	Sericite (λ = 2200 nm)		Ser is highly responsive to the ser feature extraction. This suggests a higher concentration of ser within the reef band.
	Chlorite (λ = 2250 nm)		Chl is poorly responsive throughout the reef band, indicating a low concentration of chl.
	Chloritoid (λ = 2390 nm)		Ctd is poorly responsive, suggesting very little ctd is present within the reef package.

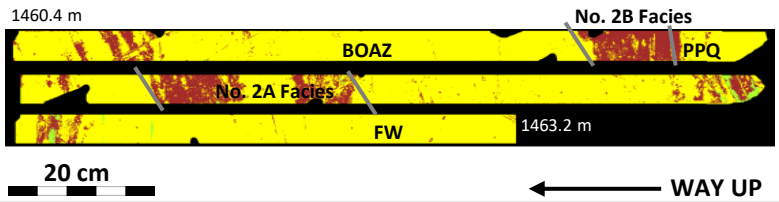
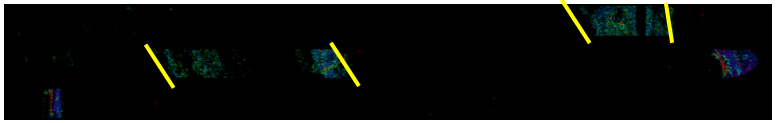
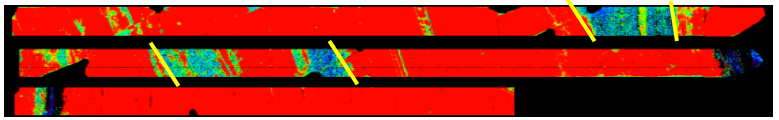
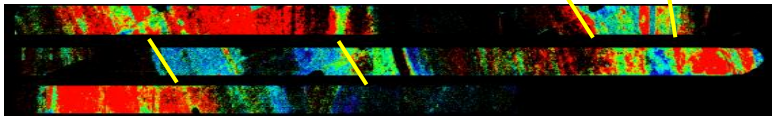
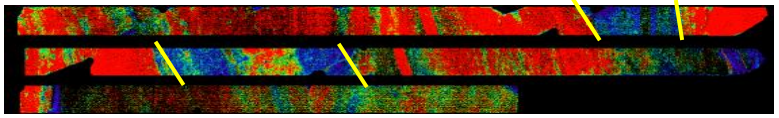
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 46 LIB 120 SW1 D0	Spectral Facies		The reef is dominantly silica-rich, with lessor amounts of prl + chl and prl + ser present.
	Pyrophyllite (λ = 2165 nm)		Prl is minimally responsive to the prl feature extraction, suggesting small amounts of prl on its own is present within the reef.
	Sericite (λ = 2200 nm)		Ser is moderately responsive to the ser feature extraction. This indicates there is a moderate amount of ser present within the reef band.
	Chlorite (λ = 2250 nm)		Chl is moderately responsive, suggesting there is a moderate amount of chl present within the reef band.
	Chloritoid (λ = 2390 nm)		Ctd is somewhat responsive to the ctd feature extraction, indicative of a small concentration of ctd within the reef.

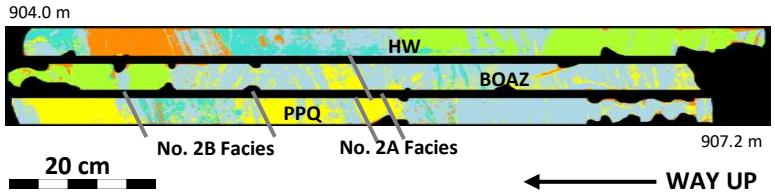
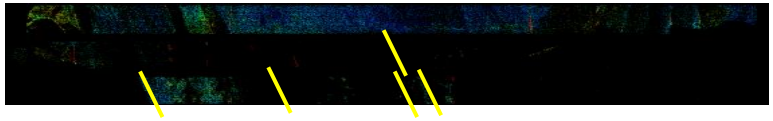
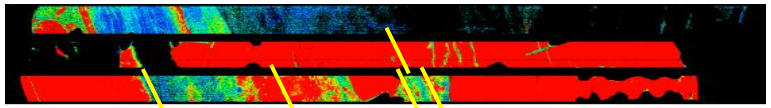
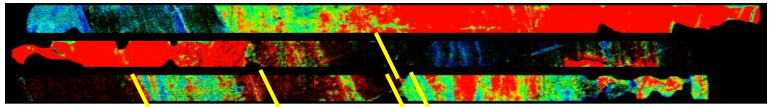
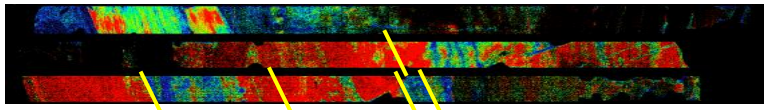
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 47 LVB 18 D0	Spectral Facies		The reef is dominated by a prl + chl and prl + ser combination.
	Pyrophyllite (λ = 2165 nm)		Prl on its own is minimally responsive to the prl feature extraction throughout.
	Sericite (λ = 2200 nm)		Ser is highly responsive, particularly nearer to the footwall contact, suggesting a higher concentration of ser is expected closer to the footwall.
	Chlorite (λ = 2250 nm)		Overall chl is moderately responsive, with the exception of higher responses closer to both contacts with the footwall of the reef.
	Chloritoid (λ = 2390 nm)		Ctd is non-responsive to minimally responsive, suggesting low concentrations of ctd within the reef.

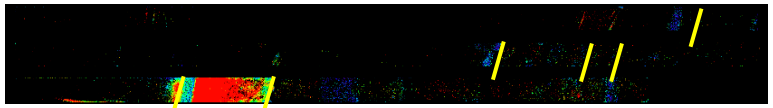
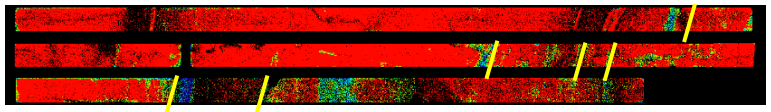
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 48 LVBI D2	Spectral Facies		The upper reef band (No. 2B Facies) has moderate amounts of both ser + chl and chl + ser combinations. The lower reef band (No. 2A Facies) is dominantly chl + ser, with lesser amounts of ser + chl.
	Pyrophyllite (λ = 2165 nm)		Both the upper and lower reef bands have little to no response to the prl feature extraction.
	Sericite (λ = 2200 nm)		The upper reef band is moderately to highly responsive, with the lower reef band having a similar response suggesting similar amounts of ser are present.
	Chlorite (λ = 2250 nm)		Chl is highly responsive in the lower portion of the upper reef band and moderately to highly responsive in the lower reef band. This indicates a higher concentration of chl within the lower reef band.
	Chloritoid (λ = 2390 nm)		Ctd is moderately responsive in the upper reef band and less responsive in the lower reef band, which suggests there is less ctd present than within the top reef band.

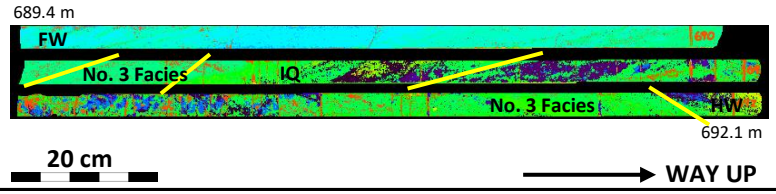
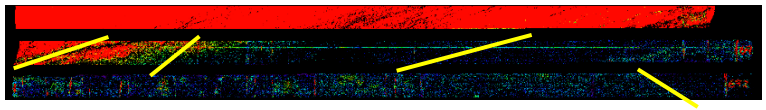
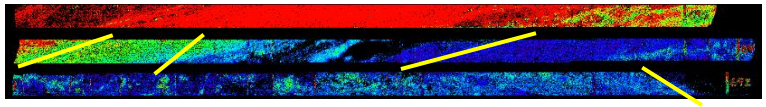
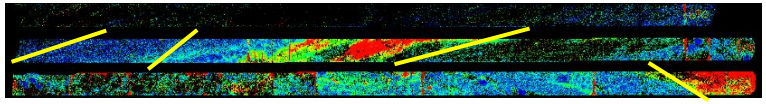
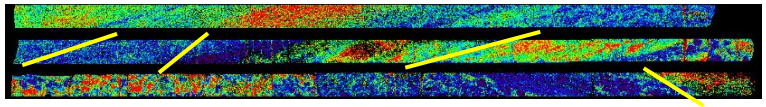
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 49 LVBI D5	Spectral Facies		Both reef bands have flat spectra, prl + ctd, prl + chl and prl + ser combinations.
	Pyrophyllite (λ = 2165 nm)		Prl on its own is non-responsive in both reef bands.
	Sericite (λ = 2200 nm)		The lower reef band (No. 2A Facies) is more responsive to the ser feature extraction indicating higher amounts of ser are present in comparison to the upper reef band (No. 2B Facies).
	Chlorite (λ = 2250 nm)		The upper reef band is moderately responsive. Higher response is seen in the lower reef band.
	Chloritoid (λ = 2390 nm)		The lower reef band is somewhat responsive, suggesting smaller concentrations of ctd. The upper reef band has a moderate to high response to the ctd feature extraction, indicating higher concentrations of ctd compared to the lower reef band.

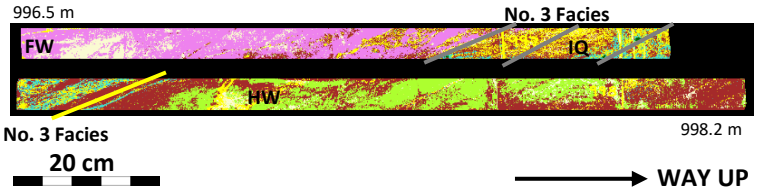
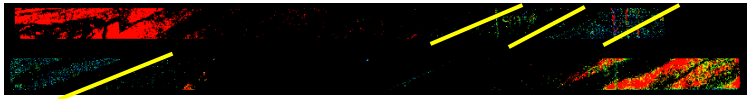
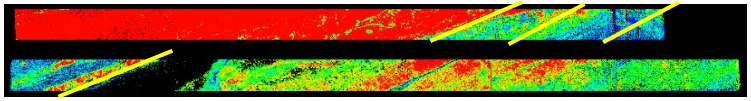
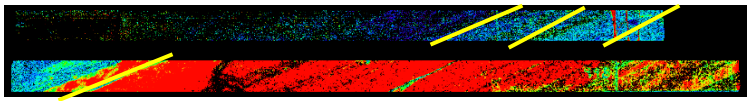
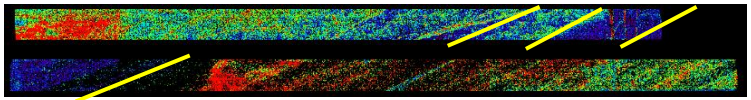
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 50 LVBI D7	Spectral Facies		The lower reef band (No. 2A Facies) has a dominantly ser + chl combination, with the upper reef band (No. 2B Facies) dominated by silica with a prl + chl combination.
	Pyrophyllite (λ = 2165 nm)		Prl has very little to no response to the prl feature extraction.
	Sericite (λ = 2200 nm)		The ser feature extraction shows ser is moderately to highly responsive, indicating ser is present within both reef bands but in lower concentrations to that of the BOAZ and PPQ.
	Chlorite (λ = 2250 nm)		Chl is moderately to highly responsive to the chl feature extraction, with higher responses at the bottom contact for the upper reef band. This suggests there is a concentration of chl nearer to the contact.
	Chloritoid (λ = 2390 nm)		Ctd has very little response indicating lesser concentrations of ctd in both the reef bands.

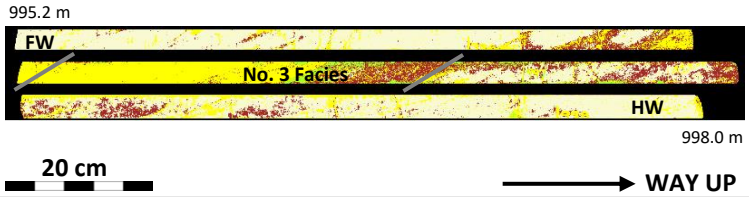
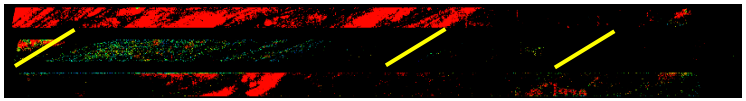
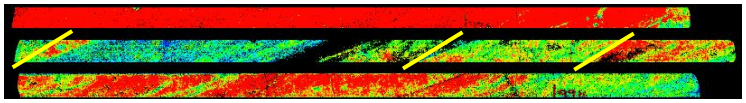
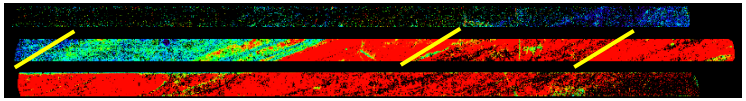
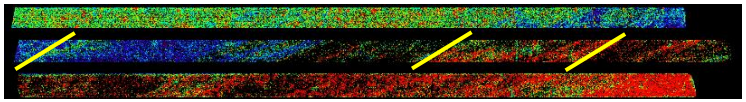
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 51 LVBI D10	Spectral Facies		Both reef bands are prl + chl and prl + ser dominant with lesser amounts of flat spectra (prl/ctd/silica/chl/white mica).
	Pyrophyllite (λ = 2165 nm)		There is very little to no response to the prl feature extraction, suggesting very little prl on its own in the reef.
	Sericite (λ = 2200 nm)		Ser is moderately responsive in the upper reef band (No. 2B Facies) and highly responsive in the lower reef band (No. 2A Facies), with a concentration of ser at the base of the bottom reef band.
	Chlorite (λ = 2250 nm)		The upper reef band is more responsive to the chl feature extraction, indicating higher amounts of chl can be found in the upper reef band.
	Chloritoid (λ = 2390 nm)		Ctd shows very little response, suggesting a small concentration of ctd is present in both the reef bands, with the exception of the middle portion of the No. 2A Facies where there is a moderate to high response.

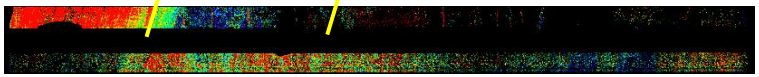
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 52 LVBK D3	Spectral Facies		Both the upper (No. 2B Facies) and lower (No. 2A Facies) reef bands are dominantly ser-rich, with smaller amounts of chl and chl + ser combinations.
	Pyrophyllite (λ = 2165 nm)		The lower reef band has a very little to no response to the prl feature extraction, and the upper reef band has minimal response. This suggests that very little prl is present in the reef bands.
	Sericite (λ = 2200 nm)		The ser feature extraction shows ser is moderately to highly responsive in the upper reef band, and moderately responsive in the lower reef band, indicating a higher concentration of ser within the upper reef band.
	Chlorite (λ = 2250 nm)		Chl is moderately to highly responsive in the No. 2A and No. 2B Facies, suggesting a moderate concentration of chl within the reef packages.
	Chloritoid (λ = 2390 nm)		Ctd has a minimal to moderate response within all the reef bands. This is indicative of lower concentrations of ctd in the reef bands.

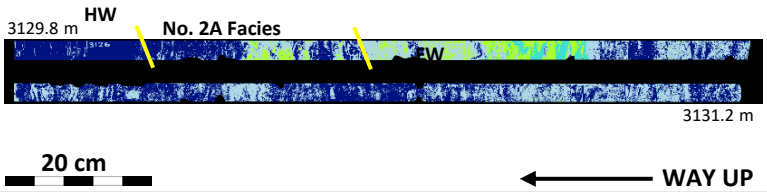
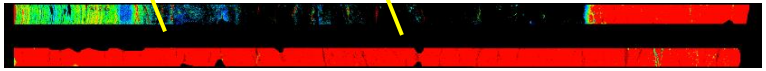
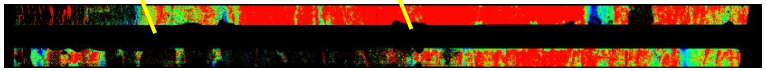
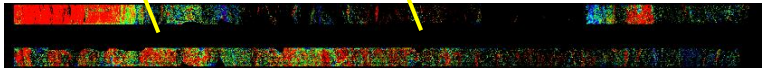
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 53 LVBL D2	Spectral Facies		The lower reef band (No. 2A Facies) has a ser and chl + ser combination. The upper band (No. 2B Facies) is silica-rich. There is a chlorite "stringer" present in the lower portion of the hangingwall.
	Pyrophyllite (λ = 2165 nm)		There is no response in this portion of the borehole to the prl feature extraction.
	Sericite (λ = 2200 nm)		Ser is highly responsive at the base of the No. 2A Facies, becoming moderately responsive to the ser feature extraction closer to the top contact with the hangingwall. There is a high response to the ser feature extraction in the No. 2B Facies.
	Chlorite (λ = 2250 nm)		Chl is moderately responsive to highly responsive, with higher responses nearer to the contacts in the No. 2A Facies. This suggests higher concentrations of chl at the top and bottom of the reef. There is no response to the chlorite feature extraction in the No. 2B Facies.
	Chloritoid (λ = 2390 nm)		Ctd is poorly responsive in the No. 2A Facies, suggesting very little ctd is present within the reef. Within the No. 2B Facies there is a high response, suggesting a higher concentration of ctd than within the No. 2A Facies.

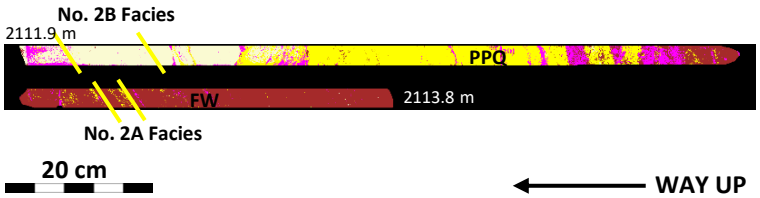
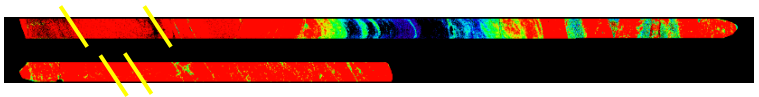
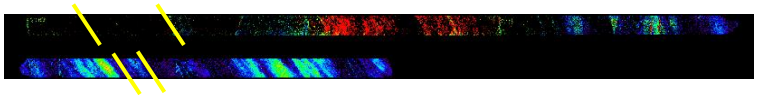
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 54 MPO LIB 2 D2	Spectral Facies		Both reef bands are chl-rich, with minor occurances of chl + ser and ctd combinations. Internal quartzite separates the two reef bands.
	Pyrophyllite (λ = 2165 nm)		Prl is non-responsive on its own, suggesting very little prl can be found within the reef band. There is a concentration of prl on the lower contact of the bottom reef band.
	Sericite (λ = 2200 nm)		Ser is moderately responsive in the reef, with a uniform response throughout the bottom reef package. The upper reef package has less of a response to the ser feature extraction.
	Chlorite (λ = 2250 nm)		Chl is moderately responsive to the chl feature extraction in the upper reef band. The lower reef band shows less of a response, suggesting lower concentrations of chl within the reef.
	Chloritoid (λ = 2390 nm)		Ctd is minimally responsive to the ctd feature extraction in the lower reef band, indicative of lower amounts of ctd within the reef band. Within the upper reef band there is a moderate response in the lower portions of the reef, suggesting higher concentrations of ctd can be found in the lower portion.

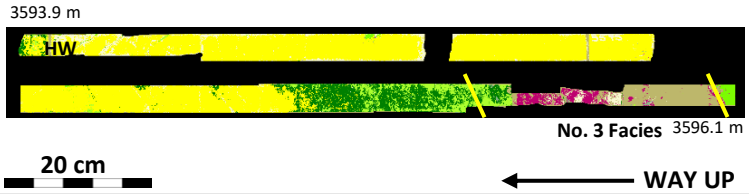
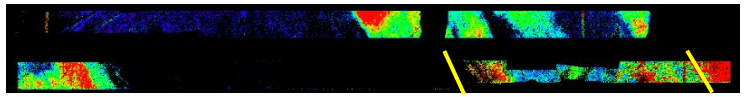
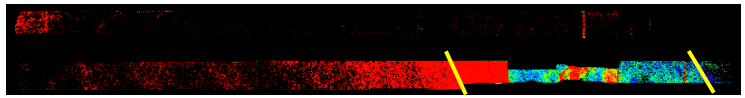
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 55 MPO LIB 3 D2	Spectral Facies		The No. 3 Facies is a combination of chl, chl + ser, prl + ser as well as flat spectra (prl/ctd/silica/chl/white mica). The two No. 3 Facies reef bands are separated by internal quartzite.
	Pyrophyllite (λ = 2165 nm)		Prl is non-responsive to the prl feature extraction, with the exception of the hangingwall and footwall units.
	Sericite (λ = 2200 nm)		Ser is moderately responsive to the ser feature extraction, with a higher response closer to the internal quartzite contact, suggesting a higher concentration of ser can be found nearer to the reef-internal quartzite contact.
	Chlorite (λ = 2250 nm)		Chl is moderately responsive, with the upper No. 3 Facies band having a high response to the chlorite extraction feature closer to the internal quartzite unit.
	Chloritoid (λ = 2390 nm)		Ctd is moderately responsive in the lower No. 3 Facies band and mostly non-responsive in the upper No. 3 Facies band, indicative of low concentrations of ctd within the reef band.

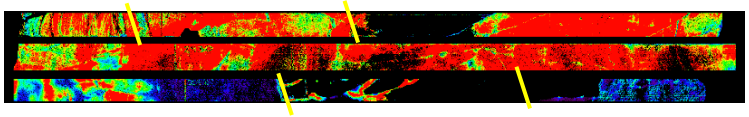
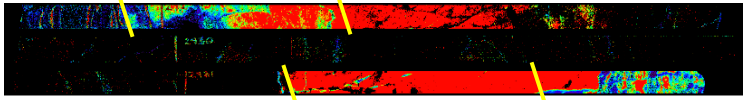
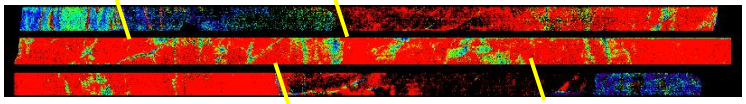
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 56 MPO LIB 3 D3	Spectral Facies		The No. 3 Facies is dominantly flat spectra, indicating a presence of prl/ctd/silica/chl/white mica, with smaller occurrences of prl + chl, prl + ser, chl and chl + ser combinations.
	Pyrophyllite (λ = 2165 nm)		Prl on its own is not responsive to the prl feature extraction. The footwall unit shows a response however the reef package does not.
	Sericite (λ = 2200 nm)		Ser is moderately to highly responsive to the ser feature extraction. In the reef band ser is concentrated at the basal contact with the footwall.
	Chlorite (λ = 2250 nm)		Chl is moderately responsive in the No. 3 Facies, with higher responses nearer to the top contact with the hangingwall.
	Chloritoid (λ = 2390 nm)		Ctd is poorly responsive, suggesting very little ctd is present within the No. 3 Facies.

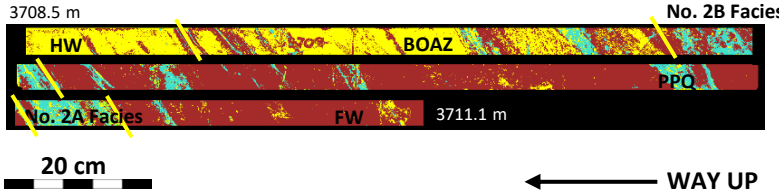
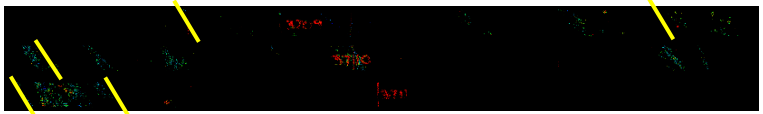
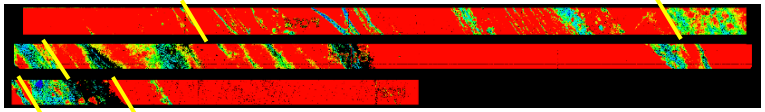
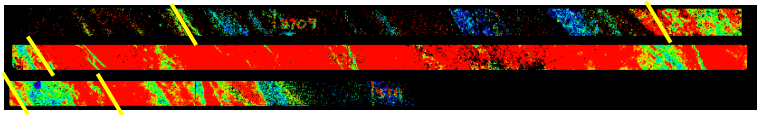
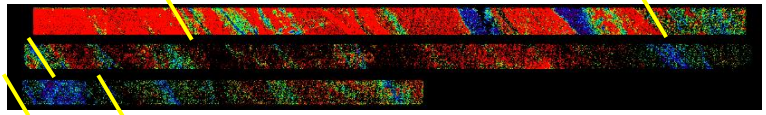
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 57 UD 2 D0	Spectral Facies		The No. 1 Facies is dominantly ser-rich, with chl and chl + ser combinations present.
	Pyrophyllite (λ = 2165 nm)		Prl is non-responsive, suggesting a very small concentration of prl within the reef.
	Sericite (λ = 2200 nm)		Ser is moderately responsive, suggesting moderate amounts of ser within the upper portions of reef.
	Chlorite (λ = 2250 nm)		Chl is moderately to highly responsive, with higher responses nearer to the footwall contact. This is indicative of a higher concentration of chl at the base of the package.
	Chloritoid (λ = 2390 nm)		Ctd has little to no response to the ctd feature extraction. A slightly higher response is seen at the top of the reef package suggesting higher concentrations of ctd are nearer to the contact with the hangingwall.

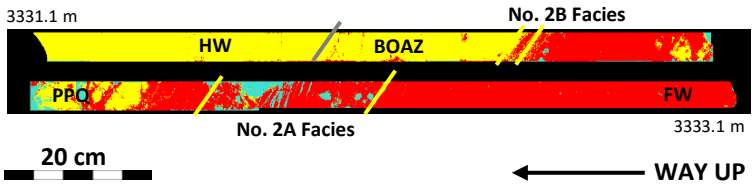
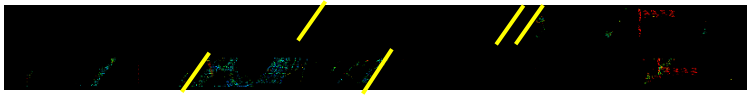
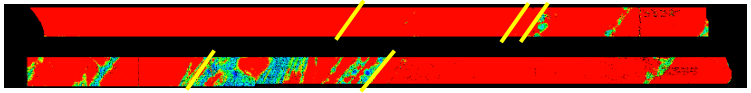
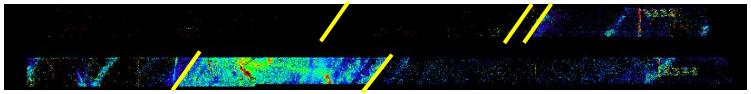
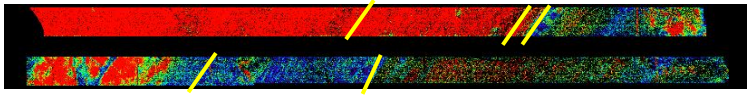
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 58 UD 2 D2	Spectral Facies		The reef band has ser and ser + ctd combinations, with ser + chl in lesser amounts.
	Pyrophyllite (λ = 2165 nm)		Prl is somewhat responsive to the prl feature extraction, suggesting minimal amounts of prl is present within the reef band.
	Sericite (λ = 2200 nm)		There is a response from ser for the ser feature extraction, suggesting there is a concentration of ser within the reef band however it is not very much.
	Chlorite (λ = 2250 nm)		The response to the chl feature extraction from chl is high, indicating a large concentration of chl within the reef.
	Chloritoid (λ = 2390 nm)		The ctd is responsive to the ctd feature extraction, suggesting there is ctd within the reef although with a very small concentration.

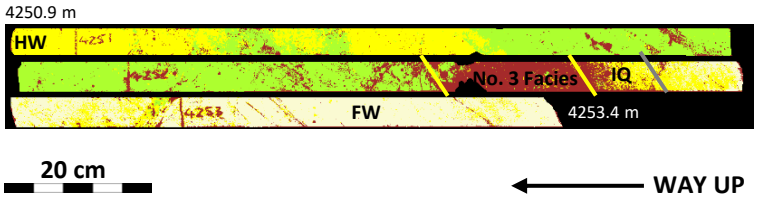
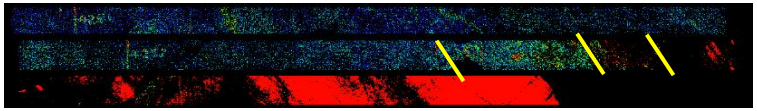
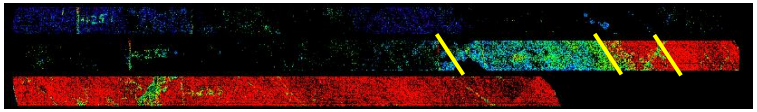
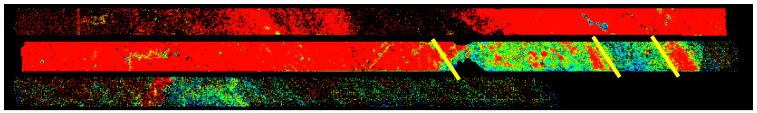
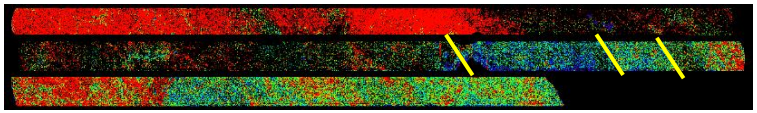
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 59 UD 5 D0	Spectral Facies		The upper reef band (No. 2B Facies) is silica-dominated. The lower reef band (No. 2A Facies) is prl + ser dominated, with small amounts of silica present.
	Pyrophyllite (λ = 2165 nm)		Prl on its own is non-responsive in the lower reef band. The upper reef band has a high response, indicating higher concentrations of prl in the upper reef band.
	Sericite (λ = 2200 nm)		Ser is highly responsive to the ser feature extraction. This suggests a higher concentration of ser within both reef bands.
	Chlorite (λ = 2250 nm)		Chl on its own is moderately responsive in the lower reef band, with no particular trend towards the contacts with the hangingwall and footwall of the reef. The upper reef band has no response.
	Chloritoid (λ = 2390 nm)		The ctd is responsive to the ctd feature extraction in the upper reef band, suggesting there is ctd within the reef. There is no response in the lower reef band.

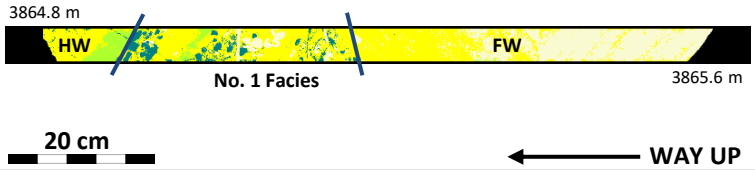
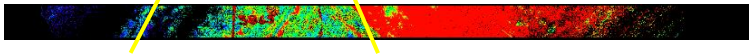
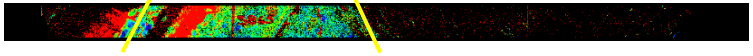
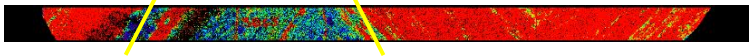
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 60 UD 13 D0	Spectral Facies		The reef has chl, chl + ser, ctd + prl, ctd + ser as well as ser combinations.
	Pyrophyllite (λ = 2165 nm)		Prl is inconsistently responsive, with a few non-responsive areas and a few highly responsive areas. The highest response is closest to the internal quartzite contact.
	Sericite (λ = 2200 nm)		Ser is moderately responsive throughout the reef, with higher responses seen nearer to the internal quartzite contact.
	Chlorite (λ = 2250 nm)		Chl is highly responsive, with the highest response nearer to the internal quartzite contact.
	Chloritoid (λ = 2390 nm)		Ctd is mostly non-responsive, indicative of low concentrations of ctd within the reef band.

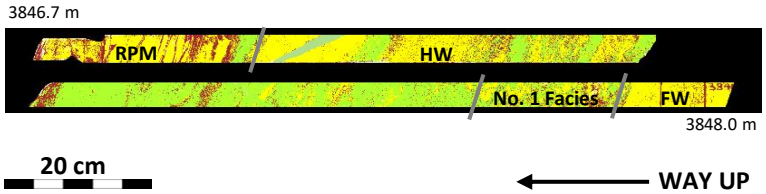
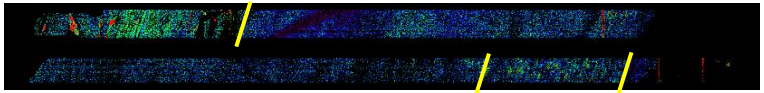
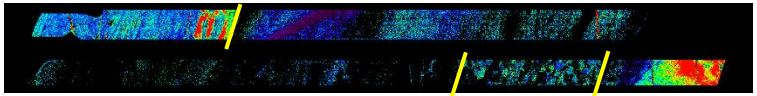
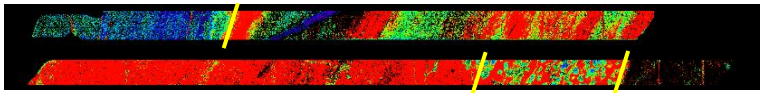
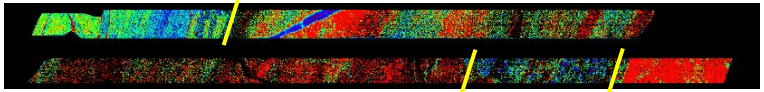
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 61 UD 15 D1	Spectral Facies		The No. 2B Facies is made up dominantly of ctd + prl, ctd + ser as well as ctd combinations.
	Pyrophyllite (λ = 2165 nm)		Prl has a minor response to the prl feature extraction in the No. 2B Facies. This indicates a lower concentration of prl in the reef band compared to the hangingwall unit.
	Sericite (λ = 2200 nm)		Ser is moderately responsive in the No. 2B Facies. There is minor response to the ser feature extraction within the BOAZ between the No. 2B Facies and the hangingwall.
	Chlorite (λ = 2250 nm)		The No. 2B Facies is moderately to highly responsive to the chl feature extraction, however not as responsive as the BOAZ immediately above the reef.
	Chloritoid (λ = 2390 nm)		The reef has a low to moderate response to the ctd feature extraction, and is more responsive than the BOAZ.

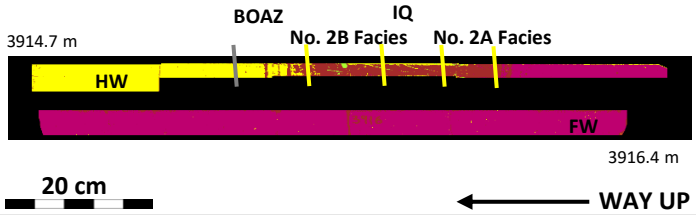
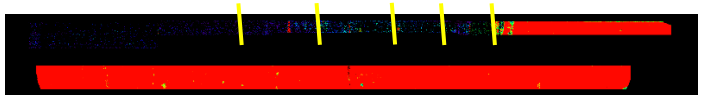
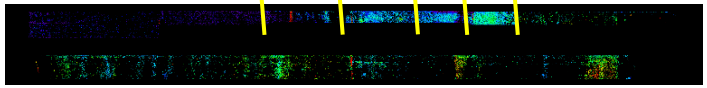
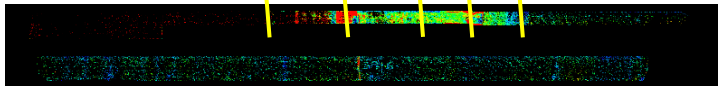
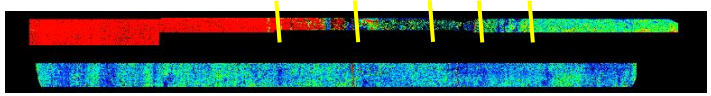
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 62 UD 25 D11	Spectral Facies		Both the upper (No. 2B Facies) and lower (No. 2A Facies) reef bands have prl + ser and ser + chl combinations.
	Pyrophyllite (λ = 2165 nm)		Prl is non-responsive to the prl feature extraction.
	Sericite (λ = 2200 nm)		Ser is moderately to highly responsive in both reef bands, indicative of higher concentrations of ser within the reef bands.
	Chlorite (λ = 2250 nm)		Chl has a moderate to high response, suggesting high concentrations of chl within the reef bands.
	Chloritoid (λ = 2390 nm)		Ctd has a minor response in the lower reef band, and more response is seen in the upper reef band.

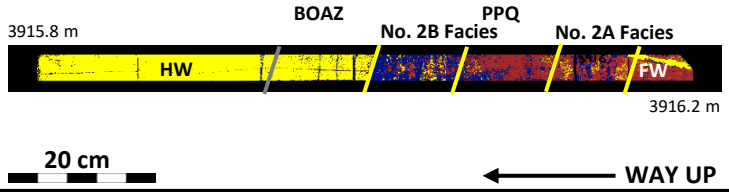
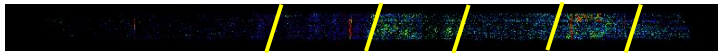
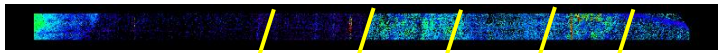
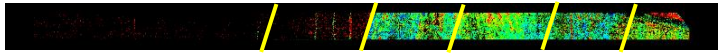
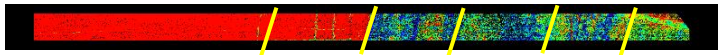
Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 63 UD 32 D8	Spectral Facies		Prl and prl + chl combinations present within the No. 2B Facies. The lower reef band (No. 2A Facies) has prl, prl + chl and prl + ser present.
	Pyrophyllite (λ = 2165 nm)		Prl has very little to no response indicating a very low concentration of prl in the sample.
	Sericite (λ = 2200 nm)		Ser is highly responsive in the upper reef band as well as in the PPQ, BOAZ and hangingwall. The lower reef band is moderately to highly responsive. This indicates higher concentrations of ser in the upper reef band and internal quartzite, with a moderate to high concentration in the lower reef band.
	Chlorite (λ = 2250 nm)		Chl is non-responsive in the upper reef band, almost unresponsive in the PPQ unit and moderately responsive in the lower reef band. Towards the contact with the footwall there is a gradual decrease in chl responsiveness. Chl concentration is suggested to be higher in the lower reef band.
	Chloritoid (λ = 2390 nm)		The upper reef band is highly responsive, with the hangingwalll quartzite being moderately to highly responsive. The lower reef band has a low ctd response. This suggests the higher concentrations of ctd are within the upper reef band and internal quartzite.

Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 64 UD 33 D15	Spectral Facies		The reef is dominantly prl + ser, with lessor amounts of chl and prl.
	Pyrophyllite (λ = 2165 nm)		Prl is somewhat responsive to the prl feature extraction, suggesting minimal amounts of prl is present within the reef band.
	Sericite (λ = 2200 nm)		Ser is moderately responsive to the ser feature extraction. This suggests there is a concentration of ser within the reef band, however not as much as within the internal quartzite and footwall units below.
	Chlorite (λ = 2250 nm)		Chl is highly responsive to the chl feature extraction, indicating a large concentration of chl within the reef.
	Chloritoid (λ = 2390 nm)		There is a small response for ctd, suggesting lower amounts of ctd are present within the reef.

Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 65 UD 36 D4	Spectral Facies		Majority of the reef displays flat spectra and silica responses with lessor amounts of chl, chl + ser and ser + chl combinations present.
	Pyrophyllite (λ = 2165 nm)		Prl has a minimal response to the prl feature extraction, indicating low amounts of prl within the reef.
	Sericite (λ = 2200 nm)		The reef shows a moderate to high response to the ser feature extraction, with a higher response closer to the footwall contact.
	Chlorite (λ = 2250 nm)		Chl is moderately to highly responsive to the chl feature extraction, with higher responses at the top contact nearer to the hangingwall. This suggests higher concentrations of chl can be found at the top of the package.
	Chloritoid (λ = 2390 nm)		A moderate response can be seen in the reef, with a slightly higher response nearer to the top contact with the hangingwall.

Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 66 UD 36 D7	Spectral Facies		Chl and prl + ser combination present in the reef package, with chl concentrated throughout the reef.
	Pyrophyllite (λ = 2165 nm)		Prl has a very low response in the reef suggesting a low concentration of prl in the sample.
	Sericite (λ = 2200 nm)		Ser has a low response in the reef portion, indicating a low concentration of ser.
	Chlorite (λ = 2250 nm)		Chl has a moderate to high response in the reef which suggests a moderate concentration of chl can be found in the sample.
	Chloritoid (λ = 2390 nm)		The reef has a very low response. This indicates a low concentration of ctd is present in the sample.

Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 67 UD 37 D1	Spectral Facies		Prl + ser as well as chl + ser combinations present in the bottom (No. 2A Facies) and upper (No. 2B Facies) bands.
	Pyrophyllite (λ = 2165 nm)		Prl has a very low response, suggesting a very low concentration of prl in the reef package.
	Sericite (λ = 2200 nm)		Ser has a low response in both reef bands, with more response closer to the footwall contact (lower reef band). This indicates a higher ser concentration nearer to the footwall.
	Chlorite (λ = 2250 nm)		Chl is moderately responsive in the reef, with a higher response towards the BOAZ immediately overlying the upper reef band. This suggests a higher concentration of chl can be found in the upper portion of the reef.
	Chloritoid (λ = 2390 nm)		Ctd has a low response in the reef, indicative of low concentrations of ctd.

Sample ID	Name	Spectal Scan	
	Image Type	**Scanned Image**	**Reef Description**
Sample 68 UD 37 D5	Spectral Facies		Ser + ctd and prl + ser combinations present in both the upper (No. 2B Facies) and lower (No. 2A Facies) reef bands. There is a larger concentration of ser + ctd in the upper reef band.
	Pyrophyllite (λ = 2165 nm)		Prl is slightly responsive to the prl feature extraction in the reef portions.
	Sericite (λ = 2200 nm)		The upper reef band is slightly more responsive to the sericite feature extraction than the lower reef band, however the ser response is low throughout the reef.
	Chlorite (λ = 2250 nm)		Chl is moderately responsive in both the reef bands, with less of a response to the chl feature extraction in the lower reef band nearer to the footwall.
	Chloritoid (λ = 2390 nm)		Ctd has a low response in both the reef bands, suggesting a lower concentration of ctd can be expected in the reef bands.